

Sept. 21, 1926.

1,600,265

W. T. WOODS

WELL DRILLING BIT

Filed April 28, 1924

FIG. 1.

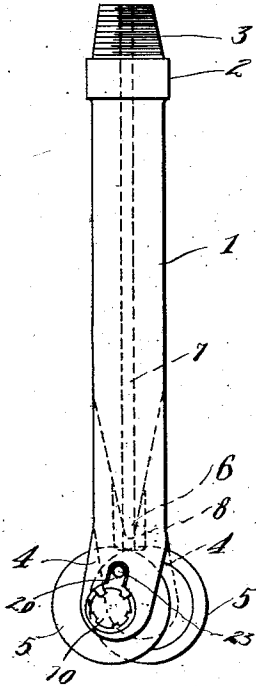


FIG. 2.

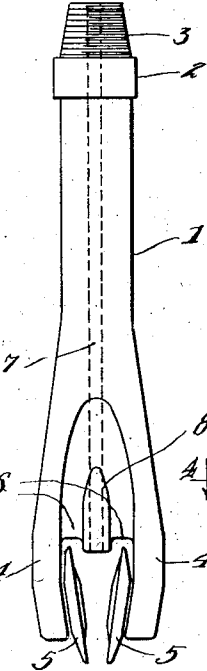


FIG. 3.

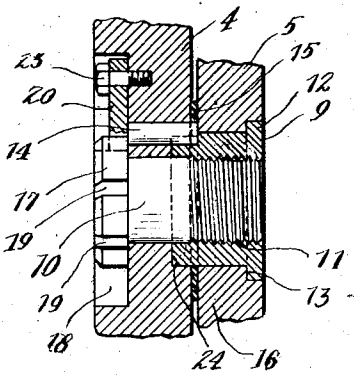
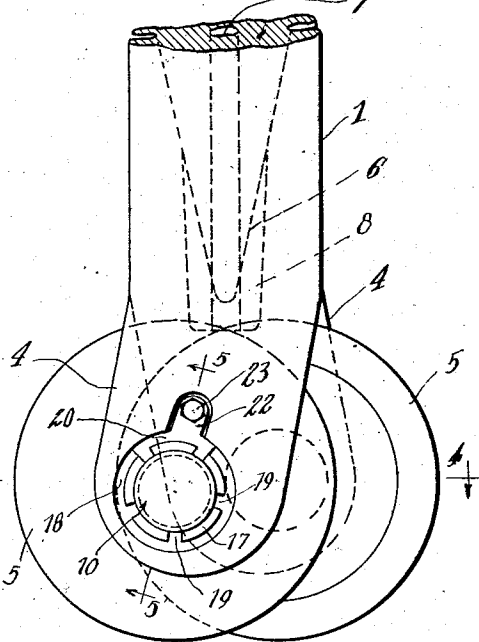
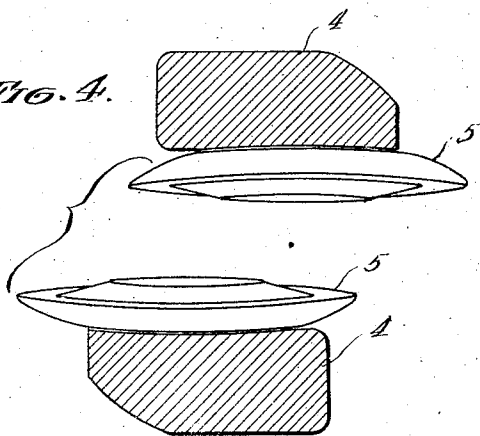


FIG. 5.

FIG. 4.



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# UNITED STATES PATENT OFFICE.

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## WELL-DRILLING BIT.

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This invention relates to well drilling bits and refers particularly to the type of well bits employing a rotary disc cutter for use in the hydraulic rotary system of drilling wells.

The disc bits heretofore employed in drilling oil wells have had a tendency to lose one or more of their rotary cutters from the bit during the drilling operation with the result that such cutter becomes lodged in the bottom of the well where it is extremely difficult to remove the same from the well.

An object of the present invention is to provide a disc bit with certain novel means for locking the rotary cutters to the bit so that such danger of the cutters being lost from the bit may be eliminated.

Various other objects and advantages of the present invention will be apparent from a description of the preferred embodiment of the invention for which purpose reference is made to the accompanying drawings which illustrate one example or embodiment of the invention.

In the drawings:—

Figure 1 is a vertical elevation of the preferred form of well bit.

Fig. 2 is a similar elevation at right angles to Fig. 1.

Fig. 3 is an enlarged elevation of the lower end of the well bit.

Fig. 4 is a transverse section on the line 4—4 of Fig. 3; and

Fig. 5 is a section on the line 5—5 of Figure 3.

Referring to the drawings, the well bit comprises an elongated body 1 having an enlargement 2 near its upper end and terminating in a tapered pin 3 by which the bit may be attached to a stand of drill rod and rotated during the drilling operations. The body 1 is provided with opposed legs 4 extending below the major portion of the body, the legs 4 being bent forwardly in the direction of rotation of the bit and preferably bowed slightly inward as indicated in Fig. 2. Each leg serves to mount a disc cutter 5 disposed between the legs and mounted thereon in planes which converge below the body, the disc being spaced somewhat apart to provide a mud clearing passage between the discs. The body between the legs and above the bit is brought to edges 6 above the disc and is relieved upwardly from the edges so that such edges may serve to cut

and divide material forced upward between the legs to prevent such material from clogging against the body of the bit. 7 indicates a flushing or mud passage extending axially through the body 1 of the bit and discharging from an enlargement 8 between the two edges 6.

Each of the discs 5 are mounted upon a bushing 9 which is held to the body by a pin 10 inserted through the outer side of the legs 4 and having an end extending beyond the inner side of the legs and there screw-threaded to the bushing 9 as indicated at 11. Each bushing 9 is provided with an out-turned annular flange 12 one end spaced from the leg 4 supporting the bushing, said flange 12 fitting in a complementary recess 13 on the inner side of the disc cutter 5. 14 indicates a dog fitted into the leg 4 and extending into a recess 15 in the bushing 9, the pin thus serving to lock the bushing 9 from rotating with the rotation of the disc cutter 5. 16 indicates a washer or wear-plate between the disc cutter 5 and leg 4, the washer 16 preferably being set partly into the body as indicated in Fig. 5.

At its outer end the pin 10 is provided with a head 17 and the leg 4 is provided with a recess 18 of sufficient depth that the head 17 does not project beyond the normal outer wall of the leg 4. The head 17 of the pin is provided with a number of notches or recesses 19 spaced at intervals around the peripheral edge of the head. 20 indicates a lock member carrying a plurality of lugs 21 which are designed to fit in a plurality of the recesses or notches 19 in the head of the pin 10, the lock member 20 having an extension 22 which fits in a radial extension of the recess 18 in the leg 4 and is there held to the leg 4 by means of a screw 23 or similar means. The lock member 20 is generally shaped to conform with the adjacent walls of the recess 18 of the leg 4 to be held thereby from movement in the leg 4.

Preferably the bushing 9 which mounts the cutter 5 is fitted into a recess 24 on the inner side of the leg so that such bushing 9 may supplement the pin 10 in resisting the force tending to shear the cutter 5 from the leg 4 during drilling operations.

The lock member 20 carrying a plurality of lugs or equivalent devices for engaging the plurality of recesses or notches on the

pin 10 of the bit will be found to be especially effective in preventing such pin 10 from rotating out of the leg 4 of the bit and will thus positively hold the mounting means of the disc about the bit and insure the disc cutter 5 being held to the bit throughout all drilling operations.

While the embodiment of the invention herein described is well suited for the purposes of this invention, it is not intended to limit the invention to the particular embodiment shown and the invention is of the scope set forth in the appended claims.

I claim:—

15 1. A rotary disc bit for well drilling comprising a body, a plurality of disc cutters, and means rotatably mounting the disc cutters on the body, said means including a pin, a bushing carried by the pin, means for preventing the bushing revolving on the pin, an arcuate recess in the body adjacent the pin, a reduced part of the recess extending outward from the side of the pin, and a lock member held in such recess and having a locking engagement with the pin operative to prevent rotation thereof.

20 2. A rotary disc bit for well drilling comprising a body, a plurality of disc cutters, and means for revolvably mounting the cutters on the body, said means including a pin for each cutter, a bushing carried by each pin, means for preventing the bushing revolving on the pin, an arcuate recess in the body adjacent said pin, the recess having an outward radial extension, and a lock member in said recess and having a reduced extension fitted in the extension of said recess, said lock member and pin having a locking engagement adapted to prevent rotation of the pin.

30 3. A rotary disc bit for well drilling comprising a body, a plurality of disc cutters and means rotatably mounting the disc cutters on the body, said means including a pin, a bushing carried by the pin, means for preventing the bushing revolving on the pin, a recess in the body adjacent the pin, a reduced part of the recess extending outward from the side of the pin, and a lock member having an enlarged portion fitting the main body of the recess and a

laterally extended portion projecting into the reduced part of said recess, said member having locking engagement with the pin and operative to prevent rotation thereof. 55

4. A rotary disc bit for well drilling, comprising a body, a plurality of disc cutters, and means for rotatably mounting the disc cutters on the body, said means including a load transferring member carried by the pin and disposed to transfer part of the load from the pin to the body, means for preventing such member rotating relative to the pin, an arcuate recess in the body adjacent the pin, a reduced part of the recess extending outward from the side of the pin, and a locking member held in such recess and having a locking engagement with the mounting means to prevent rotation thereof. 60 70

5. A rotary disc bit for well drilling, comprising a body, a plurality of disc cutters, means for mounting the disc cutters on the body, an arcuate recess in the body adjacent said mounting means, a reduced part of said recess extending outwardly from the side of the mounting means, and a locking member held in such recess and having two spaced apart locking portions for forming a locking engagement with said mounting means. 75 80

6. A rotary disc bit for well drilling comprising a body, a plurality of disc cutters, means for rotatively mounting the disc cutters on the body, said means including a member carried by the pin engaging the body for assisting the pin in carrying the drilling load, means to prevent rotation of said member, an arcuate recess in the body adjacent the pin, a reduced part of the recess extending outwardly from the side of the pin, and a locking member held in such recess and having a plurality of spaced locking lugs engaging a part of a plurality of circumferentially disposed recesses provided by the cutter mounting means and operated thereby to prevent rotation of the cutter mounting means. 85 90 95

Signed at Los Angeles, California, this 19th day of April, 1924.

WALTER T. WOODS.